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Evaluation of Regional Innovation Potential in Russia

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Abstract

Under the current conditions of developing the Russian economy the issue of forming and using the regional innovation potential has come to the forefront. A system of the regional innovation potential indexes is suggested in the article, the integrated indexes of the innovation-driven development of three regions in the Volga federal district over 2005-2010 years have been calculated. The comparative analysis of the regional innovation potential allowed detecting the major problems emerging in this field, and its possible solutions.

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Key words: innovation potential, region, innovations, integrated index

1. Introduction

In the context of the current economic state of the national economy the relevance of studying the regional innovation potential is obvious: the further development of both the national and global economy as a whole is impossible without getting the economy to a whole new level and, therefore, the shift towards the next technological structure.

In the world's practice various composite indexes, assessing the level of the innovation activity have been developed and implemented: EIS - is the European Innovation Scoreboard (Matei, M., 2010), the index of scientific and technological potential (Cherchye, L., W. Moesen, N. Rogge, T. Van Puyenbroeck, M. Saisana, A. Saltelli, R. Liska and S. Tarantola, 2008), an innovation index (Holliday, D.R. and H.E. Lowitt, 1984), a global innovation index (Zalewski, R.I. and E. Skawinska, 2010), etc.

Analysing the innovation potential by these indexes is mainly intended to the developed countries (Marxt, C. and C. Brunner, 2013; Grupp, H. and M.E. Mogee, 2004), the specific features of the developing countries have been investigated to a lesser extent. The considerable attention is paid to the role of the information and communication technologies (Hu, M.-C., N. Sharif and E. Baark, 2014), the evaluation of the innovation process efficiency (Liou, D.-Y., 2009) and its impact on the regional competitiveness. (van Hemert, P. and P. Nijkamp, 2010) The shortcomings of the applied evaluation procedures, limiting its implementation area are

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actively discussed (Grupp, H. and T. Schubert, 2010; Mairesse, J. and P. Mohnen, 2010).

In general, the current interpretations of the innovation potential category could be divided into six different approaches.

The first approach identifies the innovation potential with the concepts of the scientific, scientific and technological, intellectual and creative potential. The second approach - the resource one - considers the innovation potential as an ordered set of resources (personnel, material, technical, scientific, and technological) which ensure carrying out the innovation activity of the market agent. The third approach is based on the division of the innovation potential resources into the realized and unrealized (latent) resource opportunities, which could be taken in order to achieve the ultimate objectives of the economic agents. In the context of the fourth approach the innovation potential is analysed as the level of the ability and competence of the economic agent in carrying out the innovation activity. The fifth approach is associated with the effectiveness, in it the innovation potential is revealed through analysing the "output" of the innovation activity and reflecting the outcome of realizing the available opportunities (in the form of a new product, received during the innovation process). The sixth approach, which is a combination of the resource and effective approaches and a set of innovation resources provided in the form of the product of the innovation activity and the production sector.

2. Methodology

The basis of our analysis is a procedure of calculating the integrated index of the regional innovation potential, proposed by Alexeev S.G. (2009). We have added a new index E3 and replaced the index I4 (ref. Table 1).

Table 1. System of Regional Innovation Potential Evaluation Indexes.

Index Groups	Indexes	Notation
Scientific Potential Indexes (SP)	1. Share of the Personnel Number Involved in Research and Development in a Number of Those Involved in the Economy	S1
	2. Ratio of the Researchers with Academic Degrees (Doctors, Graduate Students) to a Number of Those Involved in the Economy	S2
Personnel Potential Indexes (PP)	1. Share of Higher Education Employees in a Number of Those Involved in the Economy	P1
	2. Ratio of a Number of University Students to a Number of Those Involved in the Economy	P2
Technological Potential Indexes (TP)	1. Fixed Asset Useful Life Factor	T1
	2. Fixed Asset Renewal Factor	T2
	3. Capital/Labour Ratio	T3
Financial and Economic Potential Indexes (FEP)	1. Ratio of Capital Investment Amount to GRP	E1
	2. Ratio of Domestic Research and Development Costs to GRP	E2
	3. Ratio of Innovation Goods, Works and Services Scope to the Total Scope of Goods Unloaded, Works Performed and Services Rendered	E3
Indexes of Information and Communication Component (IT)	1. Share of Organizations Which Used the Internet in a Total Number of Organizations Which Used ICT	I1
	2. Ratio of ICT to GRP Costs	I2

3. Number of Personal Computers per 100 Employees	I3
4. Share of Organizations Which Have Its Own Web-Site in a Total Number of Organizations	I4

For the purpose of improving the fairness of the innovation potential evaluation each year the best index of the regions is assigned a maximum value - 1, as the ratio of which the index values of the other regions have been calculated. This approach allows equilibrating the values of the analysed indexes and putting it in a comparable form. The values of the index groups (the first column of the Table 1) are calculated as a sum of the respective indexes:

$$NP = S1 + S2$$

$$PP = P1 + P2$$

$$TP = T1 + T2 + T3$$

$$FEP = E1 + E2 + E3$$

$$IT = I1 + I2 + I3 + I4$$

As the regional innovation potential is not just a sum of its constituent elements, but its complex, which is interrelated in a complicated and multiplex way, the integrated index (CI) will be calculated using the geometric mean:

$$CI = \sqrt[5]{NP \times PP \times TP \times FEP \times IT}$$

The advantage of the suggested integrated index is that it covers all the main potentials and its constituents, maximally putting in a comparable form.

3. Empiric research: basic results

The research objective is - to calculate and compare the changes in the innovation potentials of the three Russian regions of the Volga federal district: the Republic of Tatarstan, the Nizhny Novgorod and Samara regions.

The results of the integrated evaluation of the examined regions innovation potential in 2005-2010 are represented in the Table 2.

During the period under consideration in all the examined regions a number of those involved in the economy decreased, what to a great extent was due to the impact of the financial crisis in 2008. According to the Federal State Statistics Service data, in Russia a number of unemployed in 2009 increased by 30% as compared with those in 2008, and the unemployment rate was 8.3%. In terms of the personnel potential the leading position is taken by the Samara region, which is due to the largest share of the higher education employees in a number of those involved in the economy. The technological potential index is higher in the Republic of Tatarstan. This is explained by a high cost of the fixed assets as compared with the other two examined regions. We should note the significant growth of the unloaded innovation goods and rendered

services scope in the Nizhny Novgorod region, as well as the capital investment amount in 2010. The considerable costs for the information and communication components allowed the Republic of Tatarstan to take the first place in this field.

Table 2. Change in Indexes of the Regional Innovation Potential in Russia.

	Tatarstan Republic				Nizhny Novgorod Region				Samara Region			
	2005		2010		2005		2010		2005		2010	
	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank
N1	0.81	0.3	0.73	0.3	2.85	1.0	2.38	1.0	1.50	0.5	1.23	0.5
N2	0.08	0.6	0.08	0.7	0.13	1.0	0.12	1.0	0.03	0.2	0.03	0.3
NP		0.9		1.0		2.0		2.0		0.7		0.8
P1	22.00	0.9	25.40	0.8	25.00	1.0	27.10	0.8	25.30	1.0	33.60	1.0
P2	12.49	1.0	12.16	1.0	10.34	0.8	10.53	0.9	10.94	0.9	10.64	0.9
PP		1.9		1.8		1.8		1.7		1.9		1.9
T1	1.17	1.0	1.13	1.0	1.13	1.0	1.13	1.0	1.09	1.0	1.07	0.9
T2	0.10	1.0	0.10	1.0	0.09	0.9	0.07	0.7	0.06	0.6	0.06	0.6
T3	0.61	0.9	0.87	0.8	0.39	0.6	0.92	0.9	0.65	1.0	1.08	1.0
TP		2.9		2.8		2.5		2.6		2.6		2.5
E1	28.87	1.0	25.60	1.0	21.55	0.7	26.70	1.0	16.73	0.6	19.13	0.7
E2	0.63	0.1	0.54	0.1	5.02	1.0	4.80	1.0	1.92	0.4	1.81	0.4
E3	20.80	0.8	15.60	1.0	1.90	0.1	10.20	0.7	26.50	1.0	14.20	0.9
FEP		1.9		2.1		1.8		2.7		2.0		2.0
I1	52.20	0.9	95.40	1.0	53.30	0.9	92.00	1.0	56.30	1.0	88.70	0.9
I2	2.05	1.0	1.20	0.8	1.54	0.8	1.47	1.0	1.91	0.9	1.36	0.9
I3	23.00	1.0	32.00	0.9	20.00	0.9	35.00	1.0	20.00	0.9	33.00	0.9
I4	29.00	1.0	32.50	1.0	16.00	0.6	31.30	1.0	16.50	0.6	31.20	1.0
IT		3.9		3.7		3.2		4.0		3.4		3.8
CI		2.07		2.08		2.21		2.48		1.87		1.95

Thus, over five years in the three examined regions the changes in the innovation potential level have occurred:

1. The Republic of Tatarstan has come down in the innovation potential level as a result of reducing the personnel potential (from 1.9 to 1.8) and the information and communication component (from 3.9 to 3.7). This is primarily due to the decline in a number of the personnel involved in the research and development, regardless of the increase in funding for the innovative field.

2. In the Nizhny Novgorod region the innovation potential level has Increased due to the significant increase in the financial and economic potential (from 1.8 to 2.7) and the information and communication

component (from 3.2 to 4.0). These changes are determined by the increased capital/labour ratio, capital investment amount, costs for the domestic development as well as increasing the cost of the fixed assets in GRP in 2 times.

3. The innovation potential level in the Samara region has been increased through the changes in the financial and economic potential (from 1.9 to 2.0) and the information and communication component (from 3.4 to 3.7). This is due to rising the costs for the domestic research and development, the ICT costs, increasing the capital investment amount and a share of the organizations using the scientific and technical development in 2 times.

The Nizhny Novgorod region has the most promising and high innovation potential level of the three examined regions. Although while conducting the study the Nizhny Novgorod region led not in all indexes, according to the calculations carried out the final integrated index was the highest one both in 2005, and in 2010 - 2.11 and 2.41, respectively.

4. Conclusions

The positive changes in the integrated indexes of the innovation potential in the examined regions over 2005 - 2010 are insignificant. A large breakthrough could be seen only in the Nizhny Novgorod region. Although in the Republic of Tatarstan and the Samara region a large number of the industrial parks and other incubators are established, the lowest growth rates have been fixed exactly in these regions. We believe that it is necessary to emphasize the development of the small and medium-sized business entities, to reduce the market access barriers for innovations and to improve the conditions for joining the industrial parks and business incubators. We should also note the lack of the skilled personnel in the field of the innovation-driven development in all three regions. Therefore, a number of the profiles in the higher educational institutions, intended to train the specialists in the field of the innovation-driven development should be increased.

Among the main methods of supporting the regional innovation-driven development could be drawn up as follows:

1) the direct and indirect (through the government agencies) government funding of the research institutions and universities in the form of budget financing the operating costs, as well as allocating the targeted grants and placing the state orders for carrying out the research and development;

2) investing the budget funds in the capital of venture funds and other specialized financial institutions involved in implementing the innovative projects;

3) financing the business incubators, industrial parks and other infrastructure objects of the innovation activity;

4) encouraging the organizations focused on the innovation activity;

5) providing such organizations with various tax benefits (tax credits, a deferment of taxes, accelerated equipment depreciation, multiplying coefficients, which allow reducing the base for calculating the profit tax);

6) the loan and guarantee support for the small and medium-sized innovation business (low or even zero interest rates, long-term maturities, minimum requirements for securing the obligations).

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